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was that one of these songs was almost invariably repeated until he himself became tired of it before he changed to another.

The difficulty of expressing a bird's notes by words is well known, but the following attempt may give some idea of the different songs of my cardinal:—

I. *Hoit*,—*whoit, whoit, whoit* (eleven times); *hoit*,—*whoit, whoit, whoit* (eleven times).

II. *Wheù, wheù, wheù, wheù, wheù*.

III. *Tchew, tchew, tchew, tchew, tchew*.

IV. *Bird'ie, bird'ie, bird'ie*,—*tchew, tchew, tchew, tchew*.

V. *Bird'ie*,—*bird'ie, bird'ie, bird'ie, bird'ie, bird'ie*.

VI. *Whoy'it*,—*whoy'it, whoy'it, whoy'it, chickichichichichi* (a jingling trill, so long continued that it apparently ended only when the singer became "out of breath").

The notes of many cardinal grosbeaks are clear and tender—far sweeter than the mellowest notes of life or flageolet.

One of my most welcome bird-guests last summer was a summer tanager, whose favorite singing station was the summit of a tall scrub pine-tree in a corner of my yard. All day long, from May till August, no matter how hot the sun, he sang, robin-like, this song: *Ter-whit'-ter-way*,—BRING him HERE; *ter-whit'-ter-way*,—BRING him HERE (repeated incessantly, with very strong emphasis and rising inflection on the "here"). Another male of the same species, whose nest was in a neighboring pine grove, answered thus: BRING-him-HERE, *chip'-way*, BRING-him-HERE, BRING-him-HERE.

This beautiful tanager and the red-eyed virio are midsummer and midday songsters. Perhaps it is because they are representatives of tropical families that they do not mind the intense heat of the dog-days, but sing cheerily, the former from the tip-top of some tree taller than those about it, his glowing red plumage receiving, it may be, increased refugence from the burning rays of the sun, the latter, of modest olive-green and whitish garb, as he busily gleans his insect food among the shady leafage of the forest trees.

The subject of midday songsters brings me again to John Burroughs, who, always charming and usually accurate in his descriptions of bird-life, sometimes (like the rest of us) makes mistakes. The bird involved is the grass finch, for which he prefers the name vesper sparrow (since adopted by the American Ornithologists' Union), and all he says of it is true and eminently characteristic except the statement that "his song is most noticeable after sundown, when other birds are silent,"—which does not accord with my own experience in midland Virginia, where, in extensive fields of a large farm, numbers were heard singing sweetly through the hottest part of the hottest day of a hot summer,—the time being about 1 o'clock P.M., the date July 4, 1887, and the temperature 103° in the shade!

But the habits of birds do vary, and one day's observations, in the same locality, may quite contradict those of a previous occasion; therefore, only repeated observations, under varying circumstances of time and place, can give us an approximately correct knowledge of the habits of any species.

LETTERS TO THE EDITOR.

* * * Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

How are Young Spiders Fed?

In my rambles for botanical specimens in the last three years, many new and curious things have been thrust upon my attention in the insect world, and these I have recorded for future use. One fact in particular struck my attention, and I herewith submit it to the readers of *Science*, partly to record the fact, and partly to ask if any other readers of your excellent periodical have ever observed a similar fact.

We have been taught by the best works on spiders that the young of spiders derive their food mostly from the atmosphere. The "Encyclopædia Britannica" confirms this view.

On the 19th day of June, 1891, I discovered, in a ploughed

field, an enormous spider of the *Lycosidae* species, which was 1½ inches long. She presented a very curious appearance, being covered with scores of tiny spiders from one end of her body to the other. When I touched her with a weed-stem the young spiders scampered off at a lively rate, only to return when left to themselves. The spinnarets and abdomen of the mother-spider were greatly distended. Suddenly, there was a copious flow of white liquid which the young greedily devoured. Examining the fluid under my microscope, I was fully convinced that this was veritable milk, and that this spider, at least, nursed her young, instead of bringing them up on atmospheric moisture. I should be glad to know if any readers of *Science* have ever observed a similar occurrence.

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Palæolithic Man: A Last Word.

THE world was growing old apace, just as it is now, when Man first entered upon the scene here in the valley of the Delaware. Over the hills and along every lowland water-course forests grew, died, fell, and decayed, helping to make that deep deposit of soil which now covers the gravel and sand that agencies no longer active had spread over the surface of the land. Just what was the outlook that presented itself when the first Man or Men looked about them, we can only conjecture. Mr. McGee claims that the evidence favors the view that the soil had formed, the forests were old, pines had succeeded oaks, and oaks succeeded pines, and the elk, deer, and bear were the chief sources of food-supply to the wandering hunter that, reaching out from his native land, came, saw, and conquered the valley of the Delaware. But is this true? Has he or has any one so carefully studied the soil-making period that all doubt is dissipated and shown that the Indian of historic time can only trace his ancestry back to so recent a time as when the brute creation that still lingers on our frontiers was its sole occupant? If the reader, curious in such matters, will look into the literature of this subject, he will find that the evidence has been produced time and again to show that with the very commencement of this soil-making period, are so intimately associated abundant traces of a tool-making creature—a man—and in such a manner associated, that the suggestion that all such objects of human origin are "intrusive," has no real weight.

Sections of undisturbed soil, sand, and gravel are not difficult to make and when we find that as a result of a large series of such, we have a uniform result, we are bound, if reasonable men, to accept such as the truth. Now this has been done, as I have said, and the fact obtained that relics of man of a very rude character underlie those of a more elaborate one. In an earlier publication I have ventured to call the former "fossil implements" and the later ones "Indian relics;" although, of course, they were all made, I believe, by the same people, but at different times. The apparent contradiction that rude and elaborate alike are found on the disturbed surface has no bearing upon the question. What the plow or spade has displaced has no longer an archaeological significance, save as to its import as a tool or weapon of a particular character. A stone axe is an axe wherever and however found, but if it has been tossed about the fields or washed by a freshet from its original resting-place, what more can we say than that it is an axe? On the other hand, if in a section through the soil and underlying sand we find rude argillite implements and the very rudest pottery, and above them, wholly in the soil, axes, celts, pipes, and pottery of more artistic finish; find this not once, but always; then we have the right to, indeed cannot honestly do otherwise, assert that the deeper, sand-encompassed objects antedate those which occur only in the over-lying soil. This holds good in archaeological research in any part of the world, and is just as true as that in building a city to-day, we are building upon the ruins of an Indian village, or at least on ground where once the Indian passed and re-passed, even if he did not tarry long.

But can we go back a step farther? If we can do so elsewhere on the globe, I hold that it is warranted to do so here and for the same reasons. The geologists to effectively prevent this must show that the earth previously was uninhabitable; that the phy-